

Supercritical Hydrocarbon Conversion Process

Abstract

Supercritical conversion of hydrocarbons boiling above 538°C (1000°F) with a solvating hydrocarbon at a weight ratio of solvating hydrocarbon to high-boiling hydrocarbons of at least 2:1 and at conditions above the critical temperature and pressure of the high-boiling hydrocarbons–solvent mixture, in the presence of hot fluidized solids. The hydrocarbons are supplied to a reaction zone at a temperature below that of the hot solids supplied thereto, whereby the resulting hydrocarbons–solids suspension has a thermal equilibrium temperature corresponding to the reaction temperature. The conversion has high rates of sulfur, nitrogen and metals removal, nearly complete conversion to lower molecular weight products, high naphtha and distillate selectivity, and low coke formation. The supercritical conversion can replace crude distillation, vacuum distillation, solvent deasphalting, coking, hydrocracking, hydrotreating, and/or fluid catalytic cracking, and/or used in parallel with such unit operations for debottlenecking or increasing capacity.